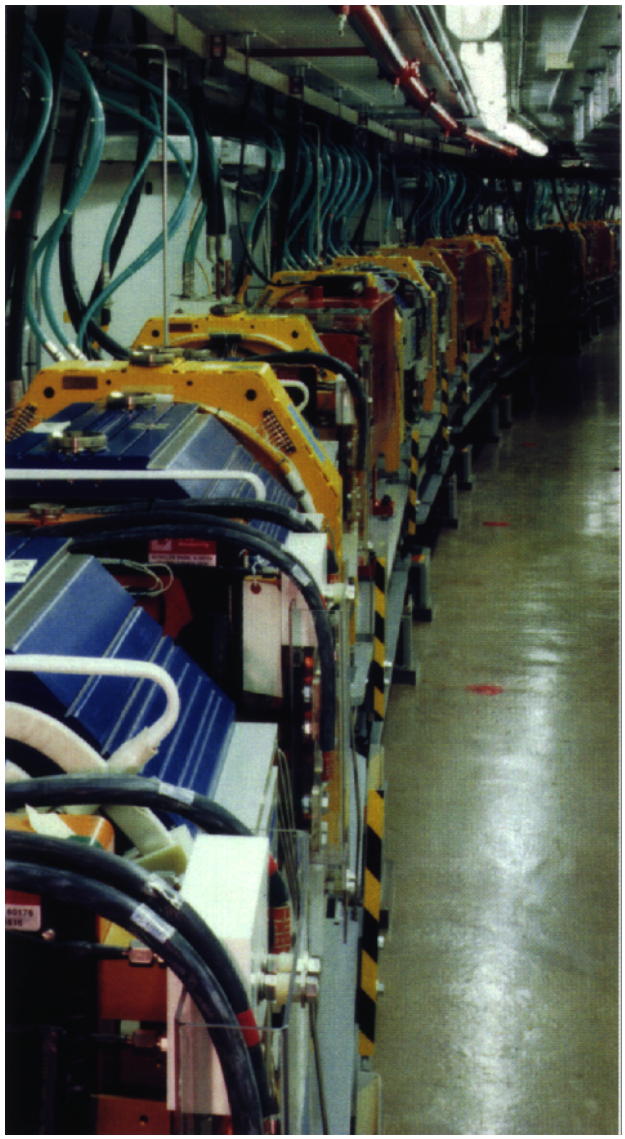
THE RESEARCH

Neutron Sources

- **High Flux Beam Reactor,** *Brookhaven National Laboratory, New York*
- **Intense Pulsed Neutron Source,** *Argonne National Laboratory, Illinois*
- **High Flux Isotope Reactor,** *Oak Ridge National Laboratory, Tennessee*
- *Neutron* **Scattering Center,** *Los Alamos National Laboratory, New Mexico*



Because of their special properties, neutrons have unique applications as probes in many fields of science and technology. Virtually everything we know about the fundamental structure of magnetic materials – which lie at the heart of today's motors and generators, telecommunications, and video and audio technologies – has been learned through neutron scattering. Among other applications are biomolecular structure, polymer science, high-temperature superconductivity, the structure and dynamics of solids and liquids, and the engineering properties of structural materials.

Light Sources

- **Advanced Light Source,** *Lawrence Berkeley National Laboratory, California*
- **National Synchrotron Light Source,** *Brookhaven National Laboratory, New York*
- **Advanced Photon Source,** *Argonne National Laboratory, Illinois*
- **Stanford Synchrotron Radiation Laboratory,** *Stanford Linear Accelerator Center, California*

Together, these complementary facilities help the research community extend basic knowledge and advance technology development in such areas as fiber and composite materials, microscopic machines, high-capacity magnetic data storage, and targeted pharmaceuticals for diagnosis and cure of major diseases. These synchrotron radiation light sources epitomize the contributions of the Office of Basic Energy Sciences research facilities, both to our understanding of fundamental science and to the technological foundations of U.S. industry.

Electron Beam Microcharacterization Centers

- **Center for the Microanalysis of Materials,** *University of Illinois*
- **Electron Microscopy Center,** *Argonne National Laboratory, Illinois*
- **Shared Research Equipment Program (SHaRE),** *Oak Ridge National Laboratory, Tennessee*
- **National Center for** Electron **Microscopy,** *Lawrence Berkeley National Laboratory, California*

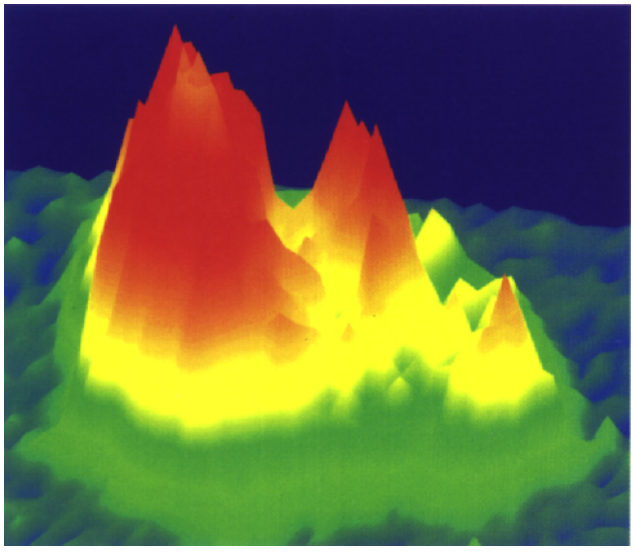
CENTERS

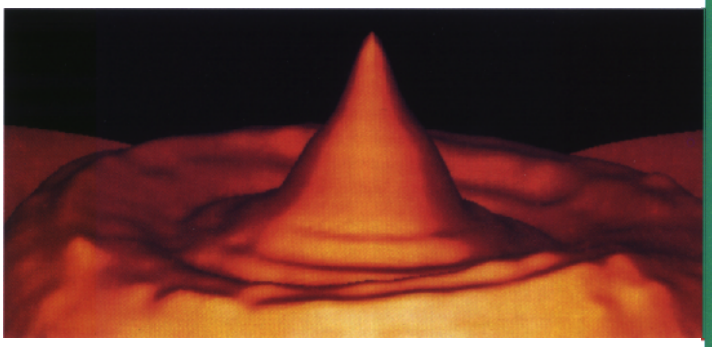
These centers offer researchers access to electron microscopes and other micro-analytical instruments – each dedicated to a different type of structural or chemical analysis, and each with a staff of professional scientists to assist users in choosing and applying appropriate micro-chemical and micro-structural methods.

OTHER SPECIALIZED CENTERS

- **Surface Modification & Characterization Research Center,** *Oak Ridge National Laboratory, Tennessee*
- **Combustion Research Facility,** *Sandia National Laboratory, California*
- **James R. MacDonald Laboratory,** *Kansas State University, Kansas*
- **Pulse Radiolysis Laboratory,** *University of Notre Dame, Indiana*
- **Materials Preparation Center,** *Ames Laboratory, Iowa*

These specialized research facilities provide unique capabilities for the preparation of unusual materials; for laser spectroscopy of atoms and molecules for understanding combustion processes and chemical dynamics: for ion beam implantation and modification of materials; for the production of highly ionized atoms, or even bare nuclei for atomic physics studies; and for the spectroscopic analysis of intermediate chemical species activated by an 8 MeV electron pulse.





THE USERS

As part of the backbone of the Nation's scientific and technological enterprise, these centers enjoy high and growing user demand. Since 1987 the number of groups conducting research at these facilities has more than tripled. The light sources alone are used by over 3,000 researchers a year for work on semiconductors, polymers, alloys, superconductors, magnetic materials, structural biology, and pharmaceuticals.

Much of the research is broad, producing knowledge that benefits more than one technology, sector, or application. As one example, the products of current research in combustion chemist find use in development of home furnaces, industrial boilers, a new generation of vehicles, and the prevention of toxic wastes.

Beyond scientists and engineers from American industry and government labs, users also include university scientists supported by several Executive Branch research agencies including the National Science Foundation, the National Institutes of Health, the U.S. Department of Agriculture, the Department of Defense, the Environmental Protection Agency, and NASA. Thousands of America's educators and students are users, as well.